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PUBLIC LANDS:

Agencies grapple with a proliferation of buzzing drones

Emily Yehle, E&E reporter
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Eight thousand years ago, nomadic families camped in Zion Canyon's shadow. Two thousand years ago, farmers appeared. Then came the Mormons.

And now: drones.

The small, unmanned aircraft have proliferated at Utah's Zion National Park in recent years, zipping through slot canyons, down trails and amid wildlife. Not long ago, someone flew a remote-controlled drone into a herd of bighorn sheep, separating the young from the adults.

The incident is part of a growing trend that has prompted the National Park Service to draft agencywide guidance on how parks should handle such "unmanned aircraft systems." Officials will release the policy in the next few weeks; until then, the agency has declared them banned.

As drones become more accessible and affordable, numerous federal agencies face a learning curve on an emerging technology that can be both a blessing and a curse. For national parks and other public lands, private gadgets pose safety and nuisance concerns. But in the hands of federal scientists, they can be useful tools for environmental research.

Since 2007, the number of applications from public entities to use drones has increased sevenfold to 373 in 2013, according to the Federal Aviation Administration. They include federal agencies, as well as state and local governments and public universities.

Chief among them is the U.S. Geological Survey, which created the National Unmanned Aircraft Systems (UAS) Project Office in 2008. The office acquired surplus drones from the Army, trained employees as pilots, and began using them for projects throughout the Interior Department in 2011.

Jeff Sloan, USGS project manager for unmanned aircraft systems, says demand has been steady ever since. Scientists use drones for everything from waterfowl population estimates to 3-D mapping of dinosaur footprints.

USGS, Boise State University and the University of Idaho partnered to used an unmanned aerial system to gather data on the landscape habitat of pygmy rabbits. Photo courtesy of the USGS.

The drones -- which weigh between 5 and 20 pounds -- can collect data that otherwise would be difficult or impossible to gather, Sloan said. The small vehicles can hover close to the ground, fly through tight canyons and navigate dense vegetation.

In several missions, "our aircraft has been able to help gather data where we probably would not have had adequate alternate means to do so safely," Sloan said in an email.

For the removal of the Elwha Dam in Washington state, for example, officials were able to collect aerial data by flying a drone below treetops that reach as high as 180 feet. And to carry out population counts for the sandhill crane, a drone flew slowly close to the ground, increasing accuracy and cutting down on noise that might scare the birds.

Next up, Sloan said: elk population surveys in California, geologic outcropping imagery collection in Utah and groundwater surveys in Wisconsin.

Research boost

At the National Oceanic and Atmospheric Administration, scientists are similarly exploring the capabilities of its drones, two PUMA unmanned aircraft systems.

The drones are part of the agency's effort to use "unmanned systems," including robotic submersibles, for marine life observations, oceanographic and atmospheric research, and environmental damage assessments, said NOAA spokesman David Miller.

"Thus far, unmanned systems have proven to be a valuable new tool in NOAA's environmental data-gathering toolbox," he said.

Miller described the PUMA as a quiet "flying camera" that allows scientists to gather population data without disturbing wildlife. At 13 pounds, it can be hand-launched and covers a range of about 50 square miles.

In September, the agency tested out one of the drones at the Florida Keys National Marine Sanctuary -- the latest in a series of flights that have taken place in marine sanctuaries throughout the country. In Florida, the drone surveyed wildlife including sea turtles and roseate spoonbills, as well as provided video and photos of abandoned vessels and boating traffic.

So far, the agency's drones have had only one public downside: media ridicule after UPS sent part of the drone to a random New York resident expecting a weight bench. The surprised recipient took to Reddit with photos and the caption, "I think I just got a drone in the mail."

Miller said the package -- which contained the drone's wings and ground control device -- is now back at NOAA's Stellwagen Bank National Marine Sanctuary.

Both Miller and Sloan underscored the difference between the term "drone," which the public might associate with the military, and the unmanned systems they use for research.

At USGS, Sloan said officials are "very diligent" about only flying over federal or state lands. If scientists want to perform some research on private land, he said, they only do so if they receive written permission from the landowner.

"The USGS has never had a problem, and usually it is the opposite -- the landowner is very interested in our research and at times has come out to observe our operations," he said.

'Boys with toys'

But the technology is still new, and at least one agency has struggled with how to best use it.

The Forest Service still sits on three drones, seven years after purchasing them. The agency's Fire and Aviation Management program bought one, using it a few times to test out its capabilities. The two others -- originally purchased for $100,000 by the Law Enforcement and Investigations program -- have never gotten off the ground.

USGS used an unmanned aerial system to help the Lower Brule Sioux monitor erosion of the Missouri River shoreline. Photo courtesy of the USGS.

The Forest Service "has no plans to use them in the future," said an agency spokeswoman. Unlike USGS, the agency bought drones before establishing a formal program; it wanted to use two of them for law enforcement.

In a memo obtained last year by Public Employees for Environmental Responsibility, Forest Service officials admitted that they did not consider any legal or privacy concerns because the 4-pound drone has no zoom capability and is "functionally similar to a camera looking at a very large parking lot with stick figures moving around."

As for why they they bought them in the first place, officials wrote that they felt compelled to do so.

"We thought if we did not take a hard look at the technology, critics would take us to task" for not examining cost-effective alternatives to current methods of surveillance, they wrote.

Despite the failure of its purchase, the Forest Service says the technology still has potential. The agency has created a working group to develop a strategic plan for deployment. Eventually, it hopes drones could be used to respond to disasters, monitor forest health and support law enforcement.

Indeed, drones have already shown their worth in fighting wildfires. During the Rim fire in California, the state's Air National Guard deployed an MQ-1 Predator, an expensive military model that provided real-time video to fire managers. Among other things, it mapped the fire's perimeter, verified hot spots outside that perimeter at night and monitored burnouts.

PEER Executive Director Jeff Ruch, who has criticized the Forest Service for its drone purchase, emphasized that his group is not against drones -- but instead is against hasty decisions to buy expensive equipment or "combating boys with toys."

Agencies, he said, need to adequately plan before buying such equipment with input from the public.

"They have to think about downstream effects," Ruch said, such as privacy concerns and whether such video could be used in lawsuits. "It seems to me public involvement is the best check of misuse."

Intruding on the 'natural soundscape'

At the National Park Service, the focus is on how to limit the use of visitors' drones to protect wildlife and preserve the park atmosphere.

Yosemite National Park was the first to broach the subject, putting out a press release earlier this month alerting visitors that drones "of all shapes and sizes" are prohibited.

Park officials say drone use has increased in recent years. Visitors have used them to film climbers and view the park from above the trees, disrupting others. Officials also worried about disturbance to nesting peregrine falcons, usually out of reach on cliff walls.

"Drones can be extremely noisy, and can impact the natural soundscape," they wrote in the release. "Drones can also impact the wilderness experience for other visitors creating an environment that is not conducive to wilderness travel."

But with no official guidance, parks like Yosemite have had to rely on existing rules to support their ban. Yosemite referenced a regulation that prohibits "delivering or retrieving a person or object by parachute, helicopter, or other airborne means."

In a recent interview, NPS spokesman Jeff Olson also pointed to the park's policy to not allow "new recreational activities" until they have been fully vetted.

"The National Park Service has a process to review new recreational activities such as flying unmanned aircraft," he said in a later email. "We are preparing guidance for parks to use to determine if flying unmanned aircraft is an appropriate park activity."

Drone enthusiasts might have better luck in a national forest. When asked about that agency's drone policy, a Forest Service spokeswoman cited Federal Aviation Administration rules on convention airflight over public lands.

"The U.S. Forest Service does not have the authority to establish any additional regulations regarding where UAS can or can't be flown," spokeswoman Jennifer Jones wrote in an email. "However, recreational UAS must abide by Temporary Flight Restrictions (TFRs) put in place by the FAA over incidents such as wildfires."

Email: eyehle@eenews.net